Risk-Informed Changes to the Licensing Basis

22.39 Elements of Reactor Design, Operations, and Safety

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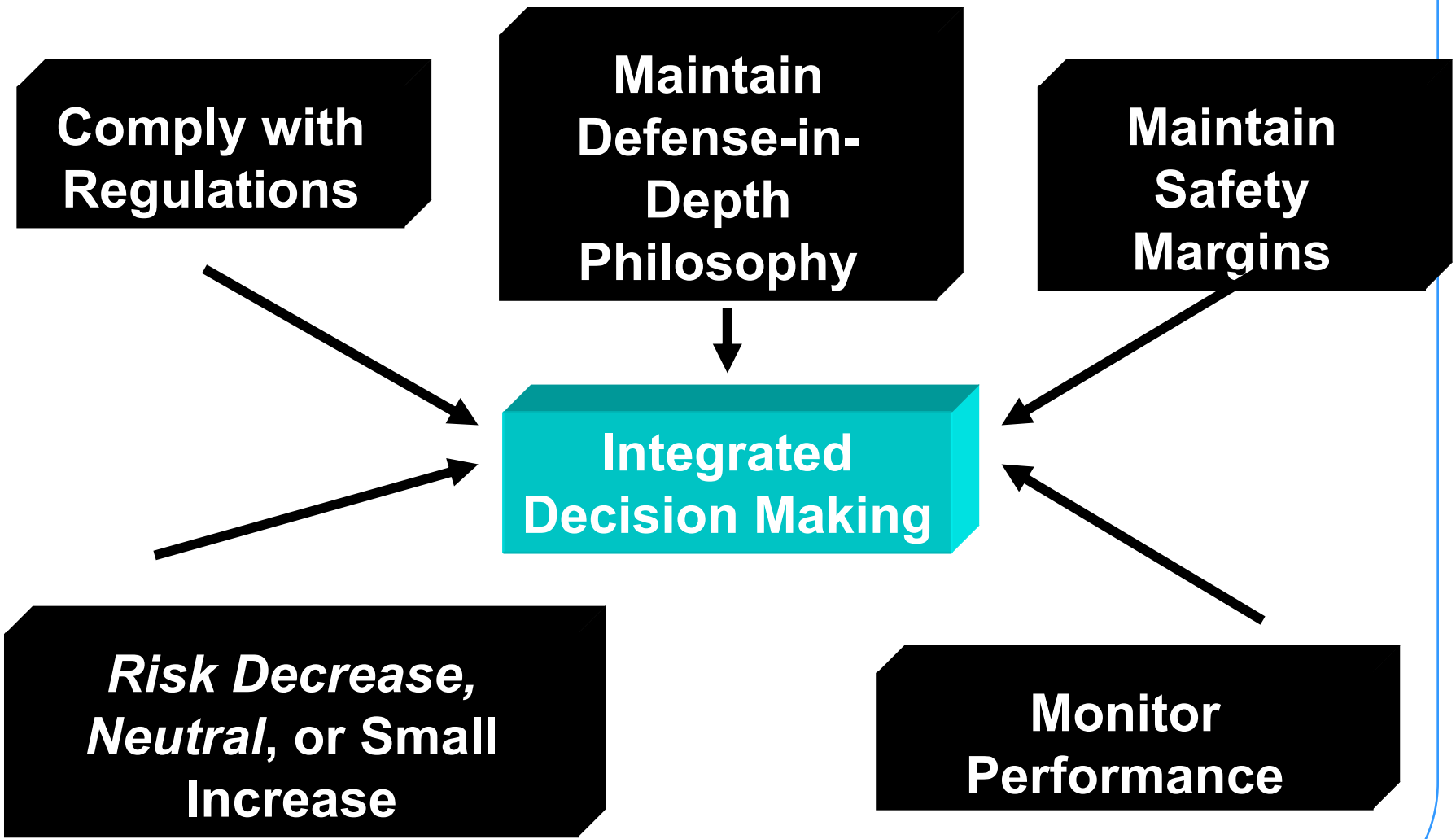
Licensing Basis Changes

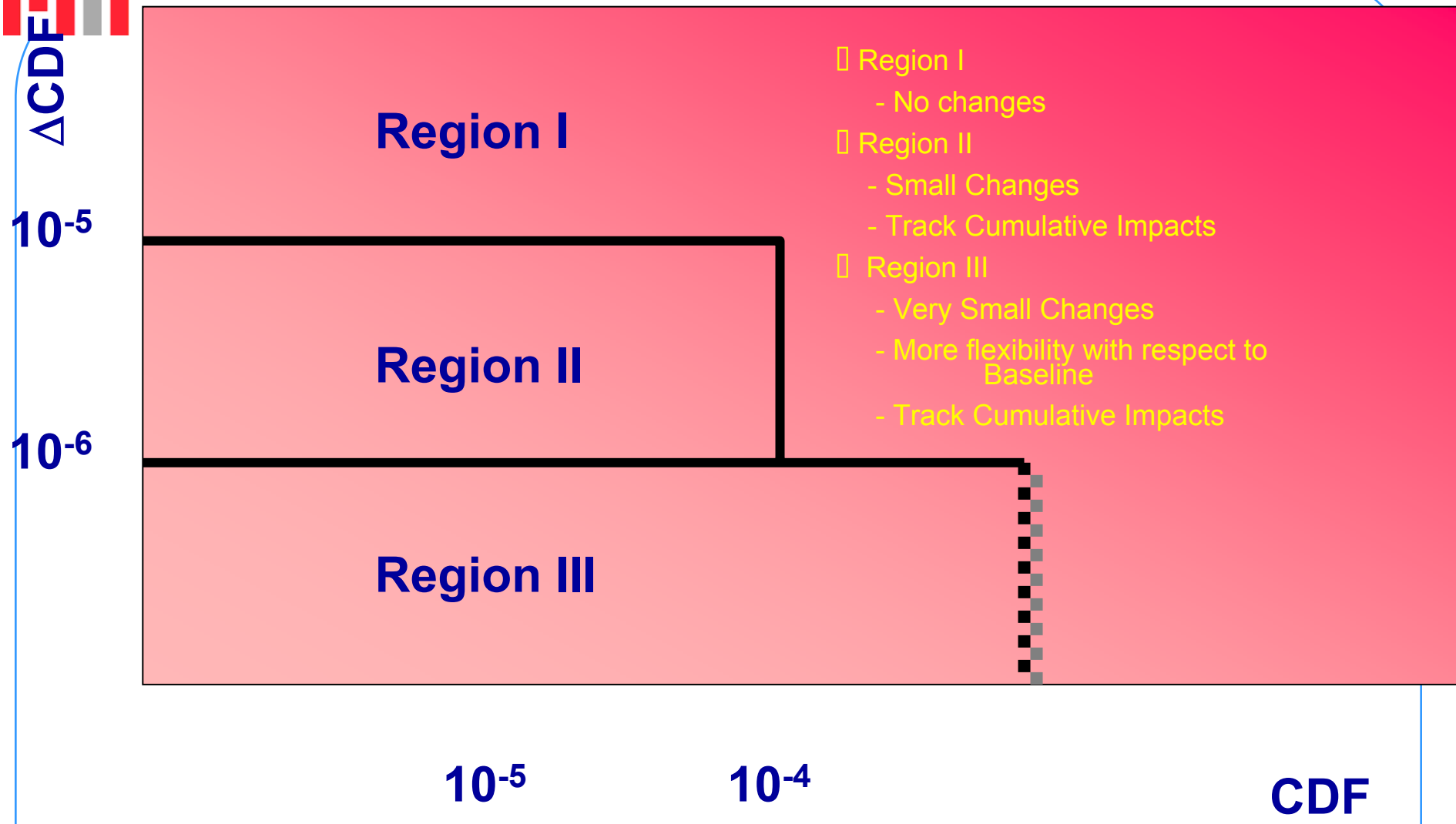
- These are modifications to a plant's design, operation, and other activities that require NRC approval.
- Regulatory Guide 1.174 (General Guidance) was issued in 1998 and revised in 2002.
- In-Service Testing (RG 1.175)
- Graded Quality Assurance (RG 1.176)
- Technical Specifications (RG 1.177)
- In-Service Inspection (RG 1.178)

The Integrated Decision-Making Process (RG 1.174)



Defense In Depth (RG 1.174)

- A reasonable balance is preserved among prevention of core damage, prevention of containment failure, and consequence mitigation.
- Over-reliance on programmatic activities to compensate for weaknesses in plant design is avoided.
- System redundancy, independence, and diversity are preserved commensurate with the expected frequency, consequences of challenges to the system, and uncertainties (e.g., no risk outliers).
- Defenses against common-cause failures are preserved, and the potential for the introduction of new common-cause failure mechanisms is assessed.
- Independence of barriers is not degraded.
- Defenses against human errors are preserved.
- The intent of the GDC in Appendix A to 10 CFR Part 50 is maintained.



Acceptance Guidelines for Core Damage Frequency

South Texas Project Experience with Allowed Outage Times

- **AOTs extended from 3 days to 14 days for emergency AC power and 7 days for Essential Cooling Water and Essential Chilled Water systems.**

- **Actual experience: Less than 5 days.**

Example: 1-out-of-2 System

$$Q = \frac{1}{3}\lambda^2 T^2 + \lambda\tau + \frac{1}{2}\lambda_{CCF} T + \gamma_0 \gamma_1$$

λ	standby failure rate
T	Surveillance Test Interval
τ	Allowed Outage Time
λ_{CCF}	common-cause failure rate
γ_0	unconditional human error rate
γ_1	conditional human error rate

ΔCDF and Δ LERF can be calculated from the PRA.